

MONTHLY WEATHER REVIEW,

MARCH, 1878.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

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INTRODUCTION.

In compiling the present Review the following data, received up to April 13th, have been made use of, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at one hundred and thirty Signal Service stations and twelve Canadian stations; monthly journals and means from one hundred and thirty-four of former, and means from twelve of latter; two hundred and forty-three monthly registers from Volunteer Observers; forty-seven monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; monthly reports of the Weather Services of the States of Iowa and Missouri; reliable newspaper extracts; special reports.

BAROMETRIC PRESSURE.

Upon chart No. II is shown the general distribution of the atmospheric pressure by the isobaric lines. Compared with the means for March of previous years the pressure for the present month averages lower than usual, except for the California coast, where it has been about the normal. From the Missouri valley to the Upper Lakes it is lower from 0.15 to 0.25 of an inch; in Nova Scotia from 0.10 to 0.15 of an inch.

The local barometric ranges, as reduced to sea-level, for the month, have been as follows: *Large*—Springfield, Mass., 1.64 in.; Portland, Me., 1.58; Mt. Washington, 1.55; Boston, 1.53; Albany, New Haven and Wood's Holl, 1.49; New London and Eastport, 1.48; Newport, 1.46; Burlington, 1.44; New York, 1.41; Philadelphia, 1.36, and Rochester, 1.33 in. *Small*—San Diego, 0.52 in.; Los Angeles and Key West, 0.55; Yuma, 0.65; Santa Fe, 0.66; Brownsville, Tex., 0.68; Mobile, 0.70; New Orleans, Vicksburg and St. Marks, 0.73; San Francisco, Pioche, Montgomery and Galveston, 0.75; and Visalia, Indianola, Nashville and Jacksonville, 0.76 in.

Areas of High Pressure.—Ten of these have appeared and are described. While the number is about the average for the month, yet none of them were very decided, as is usual for the month of March. There have not been any general "northers" in the Gulf States during the month.

No. I.—This is a continuation of the high pressure area described in the February Review as No. X. 1st, in the morning it was central north of New York; highest barometer, reduced to sea-level, 30.69 in. at Rockcliffe, Canada, and 0.65 in. above the normal at Father Point; the temperature was below zero in the Ottawa and St. Lawrence valleys, minimum -12° at Rockcliffe, and below freezing from New England to the Lakes and interior of the Middle States and North Carolina. 2nd, it was highest in the morning in southern New England, with the barometer 30.43 at New London, and 0.41 above the normal at Boston and New London; temperature below freezing from northern Michigan to New England, and below zero over the mouth of the St. Lawrence. During the day it disappeared in advance of storm No. I.

No. II.—1st, the pressure increased along the entire Pacific coast, with clear weather, the barometer at San Francisco reading 0.30 above the normal by midnight. 2d, it continued advancing eastward across the Rocky Mountain region, producing high northerly winds and gales from Dakota to northern Texas; N. 56 miles on Pike's Peak; midnight barometer at Salt Lake City 0.49 above normal; morning minimum temperature on Pike's Peak, -10° . 3rd, it extended toward the Lower Missouri valley and the Southwest, with colder and clear weather; barometer 0.30 above normal at Denver and North Platte in the afternoon. 4th, in the morning it was central in Texas and Indian Territory, with barometer 0.23 above normal at Fort Sill and Denison. 5th, morning, it covered the South Atlantic States, with cold and clear weather; temperature below freezing from northern Georgia and eastern Tennessee to New England; at Wilmington, mid-

night barometer 0.45 above normal. 6th, isobar 30.40 included the South Atlantic States and portions of Nova Scotia and New Brunswick, and 0.51 above normal at Halifax. In the first section it continued above the normal during this day and the following, while storm No. III was passing eastward. 8th, it apparently extended itself northward, with increasing pressure, over the Middle States; midnight, above normal 0.40 at Cape May, 0.44 at Burlington and 0.49 at Kingston. 9th, isobar 30.50 reached from New Jersey to the St. Lawrence valley; 0.58 above normal at Burlington and 0.68 at Farther Point. It passed to the southeastward during the 9th and 10th, in advance of storm No. V.

No. III.—During the 7th this high area advanced eastward over the Pacific States, especially Oregon, following storm No. III. 8th, morning, the barometer at Portland read 30.50, or 0.44 above the normal; by midnight 0.39 above at Virginia City. 9th, it apparently passed northward into British America.

No. IV—was first felt on the 10th as advancing southeastward over the St. Lawrence valley. 11th, morning, barometer at Father Point 0.72 above normal. 12th, isobar 30.40 included New Brunswick, with temperatures slightly above zero. During the 12th and 13th it disappeared to the eastward in advance of storms Nos. VII and VIII.

No. V—apparently advanced southeastward over the Rocky Mountain region on the 13th. 14th, morning, barometer at North Platte 0.21 above normal, and, midnight, 0.23 above at Santa Fe; afternoon it was central in Missouri. 15th, morning, central in the lower Ohio valley, with increased pressure; midnight, it covered the Southern States, and afterward rapidly lost its identity under the influence of storm No. IX, then advancing southeastward over the Lake region.

No. VI.—16th, morning, barometers at Virginia City 0.28 and North Platte 0.35 above the normals; the central highest pressure passed eastward over Manitoba; afternoon, barometer at Bismarck 0.36 above normal. 17th, it appeared as a barometric ridge, reaching from Minnesota to Nebraska, which gradually moved eastward. 18th, morning, isobar 30.20 included the country from Michigan to northern Mississippi and northeastern Arkansas, and 0.32 above normal at Milwaukee. 19th, morning, it was central in Tennessee, and only 0.19 above normal at Nashville. It was dissipated in the Southern States on that and the following day.

No. VII.—19th, advanced southeastward over Manitoba; barometer 30.40 at Ft. Garry. 20th, it covered the Upper Lake region; morning barometer at Milwaukee 30.33, or 0.34 above normal; only a slight fall in temperature accompanied it. 21st, isobar 30.20 reached from Virginia northward over Lake Ontario into Quebec, and the following morning included the Lake region and Middle States, with minimum temperatures of near zero in the Lower St. Lawrence valley and New Brunswick. During the day it rapidly disappeared under the influence of storms Nos. XI and XIII.

No. VIII.—23rd, morning, barometer at Virginia City 0.30 above normal. 24th, it passed eastward over Manitoba, with a decided fall in the temperature from the Northwest to the Lakes; morning maximum barometer 30.40 at Fort Garry. 25th, the highest was central in the Lower Ohio valley, with freezing temperatures in the morning from Virginia and eastern Tennessee northward. 26th, morning, highest barometer 30.18 at Norfolk, and then passed eastward in advance of storm No. XIV. It was this high pressure-area, in connection with storm No. XV, that caused the sudden fall in temperature nights of the 24th and 25th, and consequent injury to fruits and tender vegetables as far south as Virginia.

No. IX—advanced southeastward from Manitoba the 27th toward the Northwest. At Fort Garry, highest barometer 30.27 morning of the 28th, and only 0.14 above the normal at Pembina; 29th, highest over the Upper Lakes; 30th, morning, with increased pressure, it was central north of New York; barometer 30.37 at Rockliffe, and 0.33 above normal at Burlington. Thence it took a northeastward course, owing to the very low pressure-area prevailing on the coast of Nova Scotia.

No. X.—The month closed with a high pressure existing over the country from Oregon to Dakota and Nebraska. 31st, afternoon, barometer at Portland, Or., 0.34, and midnight at North Platte 0.26, above normals.

Areas of Low Pressure.—Of these seventeen have been traced, as shown upon chart No. I. The most severe were Nos. I, III, V, IX, X, XIII, XV, XVI, and XVII. The terrific snow-storm produced by No. III, from the 7th to the 11th, in Colorado, Wyoming and western portions of Nebraska and Dakota will always be remembered by those who experienced it. Nos. IX, X and XVI produced heavy easterly gales, shifting to northwesterly, along the Atlantic coast from North Carolina northward, and Nos. I, XV and XVII southerly veering to northwesterly gales.

No. I.—This is a continuation of the low pressure area described in the February REVIEW as No. XIII. 1st, at 7:35 a. m., it was central in northwestern Texas, with low barometer from Texas to Dakota; 0.45 below the normal at Fort Sill. By midnight it had moved to eastern Kansas, with diminished central pressure; 0.45 below normal at Leavenworth. During the day high winds, gales, and rain prevailed from the Southwest to the Northwest, partly as snow from Colorado to Dakota, with thunderstorms in Kansas, Arkansas, and western Tennessee. At Creswell, Kan., there was a furious hail, heavy rain and thunder-storm, and the streams rose five feet within three hours. 2nd, the rain-area extended to the Lakes, New England, Middle States and East Gulf States, with frequent high winds and gales, while clearing weather followed from the Missouri valley to the Gulf States. Thunder-storms occurred from Georgia to Illinois, Indiana and Ohio; tornado in Casey county, Kentucky; on Mt. Washington heavy snow fell, with a west wind of hurricane velocity. A. m., minimum barometer 29.31 at Keokuk, or 0.66 below normal.

3rd, a. m., minimum barometer 29.24 at Port Huron, or 0.72 below normal; midnight, barometer 29.17 at Eastport, and 0.75 below normal at Boston. The rain-area continued moving eastward, but generally turning into light snow in the Lake region and St. Lawrence valley, with thunder-storms in Florida and from Maryland to Massachusetts. Clearing weather extended over the Upper Lake region, Southern and Middle Atlantic States. 4th, a. m., barometer 29.08 at Eastport, or 0.84 below normal; p. m., 29.04 at Sydney, or 0.85 below. It disappeared eastward toward Newfoundland, followed by high northwesterly winds and gales from North Carolina northeastward. During its progress the following maximum hourly velocities were recorded, viz: Pike's Peak, N. 50; Camp Stockton, W. 40; North Platte, NW. 66; Cairo, SW. 42; Grand Haven, N. 36; Cleveland, SE. 38; Punta Rassa, NW. 48; Cape Henry, NW. 43; Sandy Hook, S. 36 and NW. 44; Wood's Holl, SE. 45; Thatcher's Island, S. 32 and NW. 36; and Mt. Washington, W. 96 miles. Cautionary Signals were displayed on Lake Michigan, and at the Atlantic and Gulf coast stations, excepting Florida. All were justified, except along the Gulf coast, yet the brig "Ransom" encountered very heavy seas and heavy S. gales in the Gulf on the 3rd, and heavy NW. gales on the 4th. At some distance off the Atlantic coast vessels report having experienced SW. gales, at times hurricane squalls, with tremendous sea, on the 3rd, and violent NW. gales on the 4th.

No. II.—2nd, the pressure began diminishing along the Pacific coast. 3rd, rainy weather prevailed from the northern half of California to Washington Territory, with high southerly winds and gales; p. m. barometer at Portland 29.69, or 0.34 below normal. 4th, morning, it was probably central in Montana, where light rains fell, with rapidly falling barometer thence toward the Northwest; midnight, it appeared as a barometric trough, reaching from New Mexico to eastern Dakota, with barometer lowest at Pembina, 29.44, or 0.60 below normal. 5th, it disappeared north of the Upper Lakes without any precipitation east of Montana; a. m. Pembina barometer 0.69 below normal. Maximum hourly velocities—Portland, Or., S. 36; Pike's Peak, SW. 64; Dodge City, SW. 44; Chicago, S. 35; and St. Louis, S. 38 miles. The Signals ordered for Lake Michigan, morning of the 5th, were rather late.

No. III.—5th, this storm passed over Washington Territory and Oregon at night, accompanied by high southerly winds and heavy rains; barometer 0.40 below normal at Portland. 6th, it extended to Idaho, Nevada and California. 7th, it turned into a heavy and very severe snow-storm from eastern Nevada to Colorado and Wyoming, with winds shifting to cold northerly; p. m. barometer at Denver 0.54, and midnight at North Platte 0.71, below the normals. The barometer rapidly fell from the Southwest to the Northwest, producing a steep barometric gradient and frequently brisk and high southerly to easterly winds. 8th, the severe snow-storm continued from Colorado to western Dakota, with cold northerly gales; falling and low barometer, high southerly to easterly winds and gales, and frequent rains from the Southwest to the Northwest and Lake Superior, with frequent thunder-storms; a. m. barometer at North Platte 0.70, p. m. at Dodge City 0.68, and midnight at Omaha 0.55, below the normals; during the evening, the winds in western portions of Nebraska and Kansas, shifted to cold, northerly gales. 9th, the snow-storm ceased in Colorado, but continued from eastern Wyoming to western Dakota; high southeast to northeast winds and gales and rainy weather from Missouri to Wisconsin, Minnesota and Eastern Dakota; colder, clearing weather and northwesterly gales from western Nebraska to northern Texas. 10th, it moved northwestward, with increased central pressure; easterly gales prevailed from northern Wisconsin to northern Dakota; probably united with a second depression which advanced southeastward over Dakota; p. m. barometer 0.59 below normal at Bismarck. 11th, remained almost stationary in southeastern Dakota. 12th, united with No. VII. 13th, gradually disappeared in southeastern Minnesota. Quite a number of lives are reported to have been lost in this snow-storm, also, herds of sheep. Cautionary Signals were ordered for Lake Michigan evening of the 7th and justified. Maximum hourly velocities—Red Bluff, SE. 33; Salt Lake City and Pioche, NW. 32; Santa Fe and Fort Sill, W. 40; Stockton, Texas, NW. 44; Pike's Peak, NW. 92; Cheyenne, N. 64; North Platte, SE. 44 and NW. 60; Dodge City, SW. 60; St. Louis, SE. 40; Duluth, NE. 62; Breckenridge, E. 43, and Bismarck, NE. 48 miles.

No. IV.—6th, frequent light rains fell from the Upper Mississippi valley to the Lakes, with brisk and occasionally high southerly veering to westerly winds, and with thunder-storms from eastern Missouri to Wisconsin, Michigan and Indiana. 7th, the central depression passed over northern New England, with frequent light showers from the Lower Lakes and Middle States eastward, and with thunder-storms from New Jersey and eastern Pennsylvania to Connecticut and Rhode Island. On Mt. Washington a hurricane of NW. 138 miles prevailed during the evening. Of the Cautionary Signals displayed at Kittyhawk, Cape Henry, Cape May and Sandy Hook, the two former were not, and the two latter were, justified.

No. V.—8th, developed from No. III in Texas, in the eastern half of which rain accompanied thunder storms, with increasing southeasterly winds. 9th, thunder-storms, very heavy rains, and gales occurred from eastern Texas to Arkansas, Mississippi and western Tennessee; over four inches of rain fell at Shreveport, Vicksburg and Little Rock, and a reported fall of over twelve inches at Okalooska, Ouachita Co., La., within sixteen hours, flooding the surrounding country. 10th, it was gradually dissipated in northern Georgia, after having produced southerly gales and thunder-storms in Florida, Alabama and Georgia, and a tornado at Atlanta, Ga. Signals displayed the 8th from Indianola to New Orleans, the 9th from Mobile to Key West and Cape Hatteras, were all justified except at Key West. Maximum hourly velocities—Galveston, N. 46; Mobile, SE. 48; Montgomery, SE. 36; Jacksonville, SE. 30; and Charleston, SE. 35 miles.

No. VI.—9th, during the night the barometer rapidly fell in the St. Lawrence valley. 10th, very light snow and rain was reported thence to Nova Scotia, with southerly veering to northwesterly winds, which,

on Mt. Washington, increased to a hurricane velocity of NW. 114 miles. Minimum barometer, 29.69 at Sydney in the afternoon.

No. VII.—11th, it developed in northwestern Texas, and moved northeastward, producing light thunderstorms in Indian Territory and Kansas; p. m. barometer at Ft. Sill, and midnight at Leavenworth, 0.37 below normals. 12th, it united with storm No. III; thunderstorms, with hail at places, were reported from Iowa to eastern Missouri and western Illinois.

Nos. VIII and IX.—11th, the former commenced forming in Louisiana as a secondary depression to No. VII, with thunder-storms from southern Alabama to Florida and southern Georgia. 12th, the central pressure diminished very rapidly as it moved northeastward; rainy weather and increasing winds prevailed from the Atlantic States to the Lower Lakes and Ohio valley, with thunder-storms from Florida to Ohio and New Jersey; midnight barometer at Pittsburg 29.43, or 0.51 below normal. During this day a third low pressure-area, No. IX, developed in the South Atlantic States, which at midnight was central between Norfolk and Cape May. 13th, the former passed into Canada and the latter moved up the coast; rainy weather continued from the Middle States and Lower Lakes eastward, generally turning into heavy snow from the St. Lawrence valley to eastern Nova Scotia, with thunder-storms in the Middle Atlantic States. 14th, the latter passed to the eastward over Nova Scotia. The Signals displayed for these storms from North Carolina to Maine were all justified. Maximum hourly velocities—Cape Lookout, SW. 30; Cape May, W. 72; Sandy Hook, NE. 44; Boston, NE. 24; and Eastport, E. 32 miles.

No. X.—The southern edge of this storm was felt on the 13th from Washington Ter. to northern half of California, where rainy weather prevailed; p. m. barometer at Portland, Or., 0.36 below normal. 14th, light rains fell in Nevada and Idaho, and the pressure diminished in the extreme Northwest. 15th, the centre moved southeastward over Manitoba, producing light rains and high winds thence to the Upper Lakes. 16th, the rain-area and high winds extended to the Lower Lakes and western portion of Middle States, with thunder-storms in Lower Michigan and Ohio. 17th, by morning it had developed into two distinct depressions, central near Buffalo and southwest of Cape May, which reunited by midnight off the southern New England coast; rainy weather prevailed from the Lower Lakes to the Middle and Eastern States, with easterly gales from New Jersey to Maine. 18th, as it moved northeastward, it was preceded by easterly gales and heavy rains, generally turning into heavy snow. 19th, the central pressure diminished; midnight barometer 29.28 at Chatham. Signals were ordered for the Lakes and from North Carolina to southern New England. Those on Lakes Huron and Ontario were not justified. Maximum hourly velocities—Bismarck, NW. 42; Duluth, NW. 36; Escanaba, N. 32; Cleveland, S. 36; Sandy Hook, NE. 40; Thatcher's Island and Eastport, NE. 48 miles.

No. XI.—During the progress of this storm, heavy rains fell in Cuba and southern Florida night of the 16th and the 17th. Maximum velocity at Key West SE. 29 miles.

No. XII.—This disturbance was of little interest. Occasionally light thunder-storms accompanied it in the eastern portions of Dakota and Kansas.

No. XIII.—17th, light rains occasionally fell in the Pacific States, and the barometer at San Francisco fell 0.48 below the normal. 18th, generally light rains fell from thence southeastward to the extreme western portion of Texas. The deviations of the barometric readings from the normals show that this storm crossed the Rocky Mountain region in a southeasterly direction, but its path cannot be definitely located. 19th, it passed into the Gulf, producing heavy rains in southwestern Texas. 20th and 21st, the tri-daily weather charts show it to be advancing toward Florida. Several vessels report having experienced gales and suffered damage from the same in the Gulf. The latter date and 22nd, rainy weather prevailed in Florida, with high winds and gales. Signals were displayed from Indianola to Key West. Although not justified from New Orleans to St. Marks, they served to prevent vessels from running into the storm. Maximum velocities—Indianola, NE. 40; Key West, E. 26; Tybee Island, E. 36; and Stockton, Tex., SE. 58 miles.

No. XIV.—20th, advanced southeastward over Dakota, producing brisk to high winds, and generally light thunder-storms from Iowa and Kansas to Dakota. 21st, it disappeared in the Lower Ohio valley.

No. XV.—21st, night, falling barometer indicated its approach toward Manitoba. 22nd and 23rd, it rapidly advanced southeastward over Canada to northern Maine, with generally light rains or snow the latter date from the Lakes to the St. Lawrence valley; increasing winds thence to the Middle and East Atlantic coasts; thunder-storms in Indiana and lower Michigan. 24th, the central pressure continued diminishing; barometer at Portland, Me., fell to 28.93, or 0.97 below the normal; frequent rains fell from Virginia to Nova Scotia, but turning into snow thence northward, with high southwesterly winds, veering to very cold northwesterly gales. 25th, as it moved northeastward, the barometer at Father Point read 28.82; the maximum hourly wind-velocity of the month, (NW. 156 miles,) was registered on Mt. Washington late in the afternoon. During its passage Signals were up at all the Lake stations, and Atlantic coast from Savannah northward. Maximum velocities—Breckenridge, N. 36; Escanaba, N. 40; Grand Haven, NE. 38; Port Huron, NE. 36; Sandusky, NW. 47; Rochester, W. 31; Eastport, S. 37; Thatcher's Island and Newport, NW. 48; Sandy Hook, SW. 34 and NW. 54; Cape May, S. 32 and NW. 60; and Kitty Hawk, NE. 47 miles.

No. XVI.—24th, the barometer, which had been falling the previous day along the entire Pacific coast, reached its minimum at San Francisco, 0.34 below the normal, with diminishing pressure in the Rocky Mountain region and the extreme Northwest; threatening and rainy weather prevailed in the Pacific States

and Nevada, with brisk and high southeasterly winds in latter, and thunder-storms in southwestern Oregon. 25th, it crossed the Rocky Mountain region, with frequent rains from the Pacific States to Utah and Idaho; in southern California, high westerly winds and gales. 26th, as it advanced southward, it appeared as an extensive barometric trough, reaching from the Upper Lakes southwestward toward New Mexico and northwestern Texas; light rains were occasionally reported from Utah, Arizona, New Mexico and Texas toward the Lakes, partly as snow in last section; high winds and gales from New Mexico and northern Texas to southern Dakota, with thunder-storms at places; midnight barometer at Omaha 0.60 below normal. 27th, the barometric trough continued, extending from southwest to northeast, with steep gradients from Nebraska to northern Texas; 0.59 below normal at Ft. Gibson. Threatening and rainy weather prevailed from the Gulf States to Colorado, Wyoming, southern Dakota, Iowa, Lake region and New England, partly as snow in the northeast and northwest portions of this area; thunder-storms from the Gulf States to Mo., Ill., southern Mich., Lake Erie, and western Penn.; tornada at Green Spring, Ala., with hail. 28th, it moved to the Middle Atlantic coast, with heavy rains; thunder-storms and gales from Florida to New England. 29th, it appeared to move eastward toward, and then northeastward along, the Gulf stream; high northeast to northwest winds and gales prevailed from North Carolina to Maine. 30th and 31st, it approached Nova Scotia as a severe and heavy rain-storm, but in eastern Maine and New Brunswick as an unusually severe snow-storm. The barometric gradient was remarkably steep in that region. Minimum barometer, 29.43 at Halifax. Cautionary signals were ordered the 26th and 27th for all the Lake and coast stations, and very generally reported as justified, except along Lakes Ontario and Superior. Maximum velocities—Yuma, W. 45; Stockton, W. 46; North Platte, NE. 60; Dodge City, N. 58; Ft. Gibson, SE. 36; Escanaba and Milwaukee, N. 36; Port Huron, N. 35; Cleveland, S. 33 and N. 42; St. Marks, S. 42; Cape Lookout, SW. 40; Kittyhawk, SW. 39 and NE. 37; Cape May and Sandy Hook, N. 36; Barnegat, N. 40; Wood's Holl, SW. 40; and Portland, N. 33 miles.

No. XVII.—26th, the pressure, before recovering the normal, again began diminishing along the Pacific coast, with rain-areas. 27th, the San Francisco barometer fell 0.46 below the normal, with rain and brisk to high winds thence to Nevada. 28th, the rain-area extended eastward across the Rocky Mt. region partly as snow. 29th, thunder-storms occurred in Indian Ter.; light rains or snow thence to southern Dakota, Wyoming and Utah; the central lowest pressure crossed Indian Ter. 30th, light rains fell in the Southern and Middle States; frequently heavy rains in the Ohio valley, but generally turning into snow from the Upper Lakes to the Lower Missouri valley; thunder-storms from Alabama to Illinois, Indiana and Ohio. 31st, it passed eastward over the Middle States to the coast, with a secondary depression developing in North Carolina; rainy weather, with frequent thunder-storms, accompanied it from Lake Erie and Pennsylvania to Florida. Signals were displayed along the Lakes, except Lake Superior, and the Atlantic coast from North Carolina to Mass., but were only justified for Lakes Michigan and Erie and from New Jersey to North Carolina. Maximum velocities—San Diego, S. 28; Dodge City, N. 36; Milwaukee, NE. 35; Cape Lookout, NW. 42; Cape Henry, NW. 35; and Cape May, NW. 36 miles.

INTERNATIONAL METEOROLOGY.

Storms.—January 11th, lat. 32° S., long. 31° E., strong gales W. to WNW. 17th, off Cape of Good Hope, heavy NW. gale. 19th, 27° N., 50° W., hurricane. 24th, off New Zealand, heavy SE. gales. 29th, 40° 16' N., 67° 53' W., NW. moderate storm. February 1st, 37° 20' N., 70° W., gale from NE. to E., lasting 24 hours. 2nd, 47° 58' N., 44° 45' W., moderate gale and snow squalls. 4th, 37° 20' N., 70° W., hurricane. 5th, about 44° N., 44° W., heavy NW. gale and high cross-sea; 56° 2' N., 51° 53' W., 2 p. m., SW. gale, with tremendous sea. 6th, near 44° 42' N., 36° 19' W., heavy NW. gale; 46° 8' N., 43° 40' W., 7:35 a. m., Washington mean time, barometer 28.62, temperature 45° S. 10° E. hurricane, very heavy sea from S. 20° W., weather threatening; 30° 30' S., 38° E., hurricane. 7th, 44° 09' N., 44° 56' W., 7:35 a. m., Wash. m. t., barometer 28.90, temp. 41° 5, N. 85° W. violent gale, heavy N. 78° W. swell, weather stormy. 8th, 44° 51' N., 48° 51' W., 7:35 a. m., Wash. m. t., barometer 29.40, temp. 33°, N. 78° W. violent gale, heavy N. 78° W. swell, weather stormy. 9th, 5° N., 39° W., heavy SE. squall; 5° N., 44° W., E. gale, lasting 12 hours. 10th, 47° N., 26° W., violent gale from SW. to NW., with high seas. 13th, 49° 40' N., 29° 30' W., hurricane; 43° N., 40° W., gale. 14th, 34° 46' N., 69° 10' W., revolving gale, SW. to NE., lasting thirty-six hours; 34° 50' N., 74° 30' W., severe easterly gale. 15th, 43° N., 37° W., brisk NW. gale and furious squall from NE. 16th, 39° 35' N., 32° 45' W., heavy gale and dreadful sea. 18th, between 45° and 47° N., and 26° and 29° W., (18th-19th,) very heavy gale and high sea; 44° N., 37° W., heavy hurricane, veering from S. to NW.; 46° N., 32° W., hurricane; about 50° N., 32° W., terrible NW. hurricane; 50° N., 32° W., hurricane from SE. to NNW., lasting seven hours; between Cape Hatteras and Bermuda, very heavy gale from W., veering to N., with high cross sea, lasting forty-eight hours. 19th, 45° 32' N., 39° 54' W., hurricane from SSE. to NNW., with heavy cross sea; 45° 40' N., 42° W., "hurricane from S., lasting until 21st, when it shifted to N., and blew terrific;" 47° N., 25° W., "heavy sea swept decks for 24 hours;" off Bermuda, heavy sea struck vessel, sweeping deck; about 35° 12' N., 42° 20' W., violent hurricane. 21st, about 50° N., 34° W., heavy SW. gale, with severe squalls and tremendous sea. 22nd, 44° 30' N., 128° 20' W., heavy SE. gale and sea; 41° N., 50° W., hurricane. 23rd, 51° 02' N., 34° 22' W., heavy NE. gale, very high and rough sea; 35° N., 41° W., storm. 24th, 41° 30' N., 38° 10' W., gale from NNW., with fierce squalls and tremendous seas. 26th, 42° N., 47° W., hurricane from SSW. to NW. 27th, 49° 12' N., 33° 26' W., strong W. gale, with rising sea; near 51° N., 36° 25' W., heavy w'ly gale,

with high cross-seas; 48° 07' N., 36° 05' W., heavy SW. gale, backing to NW., lasting 48 hours. 28th, w'ly gales in 48° 39' N., 34° 31' W.; 48° 13' N., 37° 24' W., with high sea; 49° 41' N., 29° 03' W., with heavy squalls and high sea; and 50° 40' N., 37° 16' W. March 1st, 46° 34' N., 43° 07' W., fresh NW. gale, with high W. sea; 51° 01' N., 10° 41' W., WSW. moderate gale, squally, high head-sea; 49° 20' N., 25° 18' W., high sea. 2nd, 48° 12' N., 40° 36' W., SW. to NW. storm, heavy squalls and high sea; 42° 49' N., 42° 31' W., 11 a. m., N. gale, with hail, snow and heavy sea. 3rd, 43° 40' N., 47° 40' W., mid-night of 3rd, violent gale and thick snow-storm; 46° 49' N., 44° 22' W., NW. storm; 50° 23' N., 24° 26' W., SW. to WNW. fresh to moderate gale, with high sea; 48° 47' N., 32° 15' W., SSW. and WNW. very severe hurricane-like gale, high irregular sea, decks under water; 49° 43' N., 10° 28' W., high sea from WSW.; 50° 27' N., 24° 59' W., WNW. strong wind and high sea; 47° 37' N., 32° 10' W., WNW. strong gale, high sea, sleet and hail; 40° N., 31° W., strong WNW. gale. 4th, 42° 09' N., 60° 09' W., S. and SW. strong gale, high SW. sea; 49° 04' N., 28° 50' W., WNW. fresh gale, high sea; 47° 56' N., 37° 15' W., WNW. severe gale, high sea; 49° 21' N., 28° 34' W., WNW. strong wind, high sea; 46° 42' N., 34° 37' W., WNW. fresh gale, very high, confused sea; 51° 33' N., 18° 03' W., W. fresh gale, lasting 12 hours. 5th, 44° 52' N., 55° 41' W., WSW. storm, dense fog; 48° 30' N., 33° 23' W., WSW. moderate gale; 47° 44' N., 33° 41' W., W. by N. fresh gale, high sea; 46° 52' N., 42° 28' W., WSW. severe gale, very high sea; 48° 11' N., 32° 40' W., WSW. fresh breeze, high sea; 51° 02' N., 19° 24' W., WNW. strong gale and squalls; 45° 58' N., 37° 50' W., high sea; 50° 55' N., 23° 18' W., fresh gale and high seas. 6th, 45° 16' N., 48° 53' W., strong SW. gale; 53° 13' N., 24° 52' W., WNW. strong breeze and high sea. 7th, 44° 24' N., 45° 38' W., moderate SW. gale; 48° 42' N., 34° 21' W., high SW. sea; 54° N., 4° E., heavy storm. 9th, 45° 26' N.; 46° 33' W., high sea from W. 11th, 42° 26' N., 55° 35' W., strong NW. breeze, with heavy squalls; 45° 23' N., 43° 10' W., fresh gale. 12th, 46° 49' N., 39° 58' W., strong gale, very high sea; 47° 48' N., 41° 08' W., SW. moderate gale, high sea; 44° 44' N., 46° 35' W., SW. and NW. fresh gale and snow squalls; 42° 05' N., 54° 56' W., NNW. stormy, heavy squalls; 44° 00' N., 47° 15' W. NW. heavy gale, high sea, snow and hail; 45° 35' N., 45° 16' W., heavy NW. gale; 44° 50' N., 45° 00' W., heavy WNW. gale, very high sea; off North Foreland, 53° N., heavy NW. gales; 48° 59' N., 45° 13' W., 4:10 p. m. Greenwich time, bar. 28.76, terrible cyclone struck, blowing with great violence from N. to NNW., till 3 p. m. 13th, tremendous sea. 13th, 45° 24' N., 42° 13' W., strong NW. gale, with very high sea; 46° 10' N., 44° 52' W., fierce WNW. gale, high sea; 40° 51' N., 63° 20' W., high N. sea; 42° 43' N., 50° 34' W., NW. gale; 50° 11' N., 27° 30' W., high southerly sea; 44° 28' N., 46° 08' W., heavy gale. 14th, 46° 59' N., 35° 28' W., WNW. stormy, high sea; 48° 38' N., 33° 14' W., high westerly sea. 15th, 45° 18' N., 41° 39' W., high W. sea; 46° 52' N., 39° 02' W., high SW. sea. 16th, 43° 59' N., 46° 53' W., SW. stormy, high sea; 44° 47' N., 44° 52' W., high SW. sea; 23° N., 67° W., ENE. gale. 18th, 49° 30' N., 24° W., terrific gale from S. round to NNW. 19th, 45° 11' N., 42° 24' W. NW. SW., fresh breeze with squalls ending with gale; 51° 25' N., 26° 05' W., gale. 20th, 42° 13' N., 59° 02' W., SE. to W. fresh gale and high sea; 43° 50' N., 48° 27' W., S. to W. strong breeze to fresh gale; 43° 7' N., 48° 19' W., south-westerly gale, confused sea; 47° 49' N., 34° 11' N., NNW. stormy, high sea. 21st, 42° 23' N., 54° 32' W., SE. and NW. strong winds and squalls; 44° 55' N., 44° 50' W., variable fresh gales and squally; 46° 21' N., 41° 41' W., high sea and heavy rain. 22nd, 41° 25' N., 59° 18' W., WNW. gale; 45° 37' N., 42° 36' W., SE. and W. strong gales, hard squalls, high sea; 43° 46' N., 48° 26' W., W. fresh gale, hard squalls; 45° 00' N., 43° 28' W., SE. and W. strong gale, high E. sea; 41° 12' N., 61° W., gale. 24th, 47° 48' N., 40° 12' W., SW. to WNW. moderate to strong gale, high sea; 42° 11' N., 59° 46' W., W. and SSW. very stormy; Moville Roads, N. of Ireland, NE. gale. 55° 22' N., 9° 05' W., N. hard gale, snow squalls, high sea. 29th, 51° 03' N., 16° 05' W., NNE. fresh gale, squally, heavy sea.

TEMPERATURE OF THE AIR.

The isothermal lines upon chart No. II illustrate the general distribution of the temperature of the air for the month. Without a single exception, the average is above that for years in every district, and especially so from the Missouri valley to the Upper Lake region, as will be seen by a reference to the table in the left-hand corner of the same chart. For the past four months the temperature has averaged very high over this same area, and more so for December and March than for January and February.

Minimum and Maximum Temperatures respectively are—in Maine, at Orono, 8° and 56°; Eastport, 9°, 53°. New Hampshire, Mt. Washington, —18°, 35°; Auburn, 12°, 64°. Vermont, Woodstock, 1°, 63°; West Charlotte, 12°, 66°. Massachusetts, Rowe, 4°, 52°; Boston, 10°, 71°. Rhode Island, Chepachet, 10°, 60°; Newport, 15°, 63°. Connecticut, Southington, 12°, 71°; New Haven, 17°, 65°. New York, North Argyle, 5°, 59°; Starkey, 10°, 80°; Nile, 6°, 72°. New Jersey, Atlantic City, 10°, 63°; Atco, 20°, 73°. Pennsylvania, Blooming Grove, 10°, 70°; Pittsburg, 16°, 74°; Cannonsburg, 18°, 78°. Delaware, Dover, 22°, 68°; Milford, 22°, 73°. Maryland, New Market, 16°, 76°; St. Inigoes, 32°, 72°. District of Columbia, Washington, 21°, 73°. Virginia, Ft. Whipple, 20°, 72°; Alto Vista, 25°, 78°; Prospect Hill, 29°, 77°. West Virginia, Helvetia, 18°, 72°; Morgantown, 18°, 75°. North Carolina, Highlands, 23°, 65°; Goldsboro, 33°, 82°; Wilmington, 34°, 84°. South Carolina, Spartanburg, 27°, 79°; Charleston, 41°, 83°. Georgia, Gainesville, 32°, 82°; Quitman, 34°, 85°. Florida, Daytona, 33°, 88°; Jacksonville, 39°, 86°; Key West, 39°, 87°. Alabama, Green Spring, 28°, 81°; Montgomery, 37°, 83°; Mobile, 42°, 83°. Mississippi, Fayette, 38°, 81°; Vicksburg, 43°, 85°. Louisiana, Oskalooska, 33°, 88°; Shreveport, 45°, 87°. Texas, Uvalde, 32°, 87°; Laredo, 44°, 90°; Brownsville, 41°, 88°. Indian Territory, Ft. Sill, 24°, 85°; Ft. Gibson, 29°, 81°. Arkansas, Mt. Ida, 32°, 84°; Judsonia, 37°, 85°. Tennessee, Knoxville,

26°, 77°; Memphis, 38°, 80°. Kentucky, Louisville, 26°, 75°; Bowling Green, 32°, 78°. Ohio, Lewisburg, 16°, 70°; Hillsboro, 23°, 84°. Indiana, Richmond, 22°, 72°; Ft. Wayne, 42°, 79°. Michigan, Alpena, 4°, 56°; Grand Rapids, 9°, 72°. Wisconsin, Neillsville, 10°, 57°; Rocky Run, 27°, 70°. Illinois, Riley, 18°, 69°; Anna, 36°, 82°. Missouri, Oregon, 22°, 83°; Springfield, 34°, 81°. Iowa, Boonsboro, 18°, 79°; Vail, 18°, 80°. Minnesota, Duluth, 17°, 62°; Breckenridge, 19°, 72°. Dakota, Fort Pembina, 13°, 70°; Yankton, 21°, 77°. Nebraska, Fort McPherson, 12°, 83°; Genoa, 22°, 84°. Kansas, Fort Leavenworth, 22°, 78°; Independence, 26°, 87°. New Mexico, Fort Union, 8°, 68°; Fort Wingate, 10°, 68°. Colorado, Pike's Peak, —23°, 33°; Fort Garland, 6°, 66°; Fort Lyon, 11°, 80°. Wyoming Territory, Fort Sanders, 11°, 66°; Fort Fetterman, 14°, 75°. Utah, Coalville, 12°, 72°; Salt Lake City, 27°, 73°. Idaho, Boise City, 26°, 75°. Nevada, Winnemucca, 14°, 69°; Camp McDermitt, 15°, 73°. California, Fresno, 32°, 80°; San Francisco, 46°, 66°; Red Bluff, 34°, 76°. Montana, Oregon and Washington Ty., not yet received.

Ranges of Temperature.—The monthly ranges will appear from an examination of the minimum and maximum temperatures just given. The smallest ranges occurred along the California and Gulf coasts; the largest ranges are reported from New England, Lake region, Missouri and Red River of the North valleys and Wyoming Territory. *Greatest Daily Ranges.*—In New England, they vary from 22°, least, at Eastport to 42°, greatest, on Mt. Washington; Middle States, from 24° at Cape May to 38° at Norfolk and Lynchburg; South Atlantic States, from 16° at Cape Lookout to 37° at Augusta; East Gulf States, from 11° at Key West to 35° at Montgomery; West Gulf States, from 18° at Galveston to 35° at Corsicana; Tennessee, from 29° at Memphis to 39° at Knoxville; Ohio valley, from 26° at Cairo to 36° at Pittsburg; Lower Lake region, from 26° at Detroit to 40° at Erie; Upper Lake region, from 24° at Port Huron to 37° at Milwaukee; Upper Mississippi valley, from 26° at La Crosse to 30° at all the other stations; Lower Missouri valley, from 30° at Omaha to 41° at Yankton; Red River of the North valley, 40°; western Texas, from 33° at Laredo to 45° at Stockton and 48° at Henrietta; Indian Territory to western Nebraska, from 35° at Fort Gibson to 42° at North Platte; Rocky Mountain stations, from 23° on Pike's Peak to 44° at Denver; Utah and Nevada, from 28° at Salt Lake City and Pioche to 36° at Winnemucca; Idaho, 29° at Boise City; California, from 15° at San Francisco to 36° at Yuma.

Frost out of Ground.—Massachusetts from 10th to 14th; New Hampshire, 31st. The ground was reported as frozen in Maryland on the 25th; Michigan, 20th, 24th, 25th, 29th; New York, 25th; Virginia, 5th; Kansas, 4th.

Ice is reported to have formed as follows: Ohio, 5th, 25th, 29th; Tennessee, 25th and 26th; Indiana, 25th; Kentucky, 25th; Illinois, 19th, 20th, 25th, 29th; New Jersey, 5th, 25th, 26th; Iowa, 25th; Kansas, 4th, 10th, 13th, 31st; Maryland, 17th, 21st; Nebraska, 11th, 12th, 16th, 28th, 29th, 31st; New Hampshire, 31st; New York, 16th, 21st, 22nd, 25th, 26th; North Carolina, 26th; Ohio, 25th; Pennsylvania, 5th, 16th, 21st to 26th and 30th; Vermont, 15th, 16th; Virginia, 5th, 20th, 21st.

PRECIPITATION.

On chart No. III is illustrated as accurately as possible the general distribution of the rainfall, which includes the melted snow, for the month. In the left hand corner of the same chart will be found a table giving the average precipitation for March by districts. The excess has been greatest in Minnesota and the Upper Lake region. There has been quite a large deficiency from the South Atlantic and Gulf States to the Ohio valley, but the greatest deficiencies occurred in Tennessee, the South Atlantic States and at Portland, Or.

Special Heavy Rains.—1st, Fort Larned, Kan., 1.20 inches. 8th, Breckenridge, Minn., 2.22 inches. 6th, Lebanon, Mo., (9th and 10th,) 2.28 in.; New Orleans, La., 2.73 in. in about 7 hours; Vicksburg, Miss., 4.46 in.; Clarksville, Tex., 2.00 in. in 5 hours; Springfield, Mo., (8th and 9th,) 3.25 in.; Shreveport, La., 4.14 in.; Mt. Ida, Ark., (8th and 9th,) 2.30 in.; Fayette, Miss., 3.60 in.; Okalooska, La., 12.65 in., (?) in 16 hours; Brookhaven, Miss., 3.00 in.; Baton Rouge Barracks, La., 3.50 inches. 10th, New Orleans, La., 2.04 in.; Boonsboro, Iowa, (8th to 10th,) 2.80 in.; Fort Barrancas, Fla., 3.25 in. in 5½ hours. 11th, Dover, Del., (11th and 12th,) 2.00 in.; Mendon, Mass., 2.00 in.; Fort Barrancas, Fla., 3.18 inches. 12th, Woodstock, Md., (11th, 12th and 13th,) 3.60 in.; Fall River, Mass., (11th to 13th,) 2.35 in.; Lynchburg, Va., 2.14 in.; Fort Whipple, Va., 2.28 in.; Washington, D. C., 2.60 in.; Green Castle, Pa., 2.37 in.; Moriches, N. Y., (11th and 12th,) 1.93 in.; College Hill, Ohio, 2.25 in.; Capeville, Va., 2.80 in., (2 inches in 1 hour); Bethel, Ohio, 2.00 in.; Mt. Auburn, Ohio, 2.32 in.; Fall River, Mass., (11th and 12th,) 2.26 in.; New Market, Md., (11th and 12th,) 2.48 in.; Ruggles, Ohio, 2.60 in.; Deadwood, D. T., 1.70 in.; Fort Pembina, Dak., 1.85 in.; Fort Hamilton, N. Y., 2.48 in.; Daytona, Fla., 2.42 inches. 13th, Accotink, Va., (12th and 13th,) 2.90 in.; Vineland, N. J., (11th to 13th,) 2.10 in.; Somerset, Mass., (11th to 13th,) 2.44 inches. 18th, Waltham, Mass., (17th and 18th,) 3.55 inches. 19th, Uvalde, Tex., 2.21 inches. 26th, Independence, Kan., (26th to 28th,) 3.12 inches. 27th, Fort Barrancas, Fla., 2.80 inches. 28th, St. Marks, Fla., 4.95 inches.

Largest monthly rain-falls.—At Okalooska, La., 13.77 inches; Ft. Barrancas, Fla., 10.75 in.; Mt. Washington, N. H., 10.66 in.; Halifax, N. S., 10.28 in.; Syndey, C. B., 9.57 in.; St. Marks, Fla., 8.65 in.; Olympia, W. T., 7.90 in.; Roseburg, Or., 6.36 in.; Portland, Or., 6.23 in.; Waltham, Mass., 6.85 in.; Judsonia, Ark., 6.75 in.

Smallest monthly rain-falls.—Ft. Griffin, Ft. Richardson, and Pilot Point, Tex., too small to measure; Coleman City, Tex., 0.03 in.; Graham, Tex., 0.12 in.; Yuma, A. T., 0.13 in.; Jacksboro, Tex., 0.15 in.; Ft. McKavitt, Tex., 0.19 in.; Decatur, Tex., 0.23 in.; Ft. Garland, Col., 0.24 in.; Burkes, A. T., 0.28 in.

Floods.—9th, crevasses reported 18 and 35 miles below New Orleans; heavy freshets also occurred in

the vicinity of Okalooska, La. 12th, Mansfield, O., following a heavy thunder-storm, Rocky Fork over flowed its banks and flooded lower portion of city; destructive freshets in the vicinity of Wheeling, W. Va. 31st, the Sacramento valley still remains under water, the depth of water at Sacramento City oscillating between 22 ft. 1 in. and 22 ft. 3 in. throughout the month, the southern suburb below "cross levee" and the village at Washington are still submerged; at Colusa, on the 30th, the water was still near high water mark.

Hail.—1st, Ft. McPherson, Neb.; Baxter Springs, Kan.; De Soto, Neb.; Franklin, Pa. 2nd, Sidney Bks., Neb.; Martinsville, Ill.; Milford, Ind.; Fayetteville, N. C.; Indianapolis, Ind. 3rd, Ft. McHenry, Fallston and New Market, Md.; De Soto, Neb., Freehold and Pleasant Run, N. J.; Ardenia, N. Y.; Accotink Va.; Carlisle and Philadelphia, Pa. 4th, De Soto, Neb. 6th, Rockford, Ill.; Detroit, Mich.; Burlington, Ia.; Logansport, Ind. 7th, Baxter Springs, Kan.; De Soto, Neb.; Catawissa, Pa.; Boise City, Idaho; New London. 8th, Emerson, Neb.; Beloit, Wis.; Ft. Gibson, I. T.; Fredericksburg and Uvalde, Tex.; Duluth. 9th, Brookhaven, Miss.; Corsicana and Galveston, Tex. 10th, Kensico, N. Y. 11th, Ft. Independence, Mass.; Nora Springs, Ia.; New Bedford and Fall River, Mass.; Kensico, N. Y.; New London. 12th, Cornish, Me.; Kensico, N. Y.; Nashville. 13th, Milford, Ind.; Rowe, Mass.; Woodstock, Vt.; Mt. Solon, Accotink and Fort Whipple, Va.; Bangor and Eastport, Me. 15th, Muscatine, Ia. 16th, Chicago; Detroit. 17th, Reading, Pa. 18th, Ft. Garland, Col.; Creswell, Kan.; Somerset, Mass.; Winnemucca, Nev.; Santa Fe N. M.; New London. 19th, North Volney, N. Y. 20th, Iowa City, Ia.; Genoa, Neb. 23rd, Fort Wayne and Grand Haven, Mich. 24th, Fallston, Md.; Somerset and New Bedford, Mass. 26th, Ft. Wallace, Kan.; Fresno, Cal.; Vevay, Ind.; Independence, Kan.; Detroit. 27th, New Orleans; Vicksburg; Albany; Green Spring, Ala.; Creswell and Independence, Kan.; Brookhaven and Fayette, Miss.; Corsicana and Mason, Tex. 28th, Salt Lake City; Portsmouth, N. C.; De Soto, Neb.; Fayetteville, N. C.; Spartanburg, S. C.; Clarksville and McMinnville, Tenn.; Coalville, Utah; Los Angeles, Cal. 29th, Dodge City, Kan. 30th, Camp McDermitt, Nev.; Ft. Fred Steele, Wy. Ty.; Fayetteville N. C.; Cincinnati and Lewisburg, Ohio; Brownsville, Pa. 31st, Lewisburg, Ohio; Westchester and Philadelphia, Pa.; Morgantown, W. Va. At Creswell, Kan., on the 1st 2:30 p. m., a furious hail-storm from SW.; 2 inches of hail and 1.58 in. of water fell in 30 minutes.

Depth of Snow at close of Month.—On summit of Mt. Washington, 42 in.; Pike's Peak, 40 in.; Eastport, Me., 15 in.; Elmira, Ill., 1 in.; Rowe, Mass., in woods in vicinity, 6 in.; Dunbarton, N. H., snow drifts in neighboring forests; Urbana, Ohio, 1-10 in.; Catawissa, Pa., 1-10 in.; Woodstock, Vt., half of surface of ground covered.

Rainy Days.—Number of days on which rain or snow has fallen varies as follows: New England, from 8 to 23; Middle Atlantic States, from 6 to 21; South Atlantic States, from 4 to 8; Gulf States, from 4 to 9; Ohio valley, from 7 to 17; Tennessee, 10; Lower Lake region, from 15 to 23; Upper Lake region, from 9 to 18; Upper Mississippi valley, from 10 to 15; Lower Missouri valley, from 7 to 13; Rocky Mountains, 8; Pacific Coast States, from 9 to 18.

Cloudy Days.—For New England the number varies from 8 to 17; Middle Atlantic States, 4 to 13; South Atlantic States, 4 to 10; Gulf States, 2 to 10; Tennessee, 4 to 7; Ohio valley, 6 to 15; Lower Lake region, 12 to 18; Upper Lake region, 10 to 18; Northwest, 4 to 12; Rocky Mountains, 6 to 13; Pacific Coast States, 5 to 18.

RELATIVE HUMIDITY.

The average percentage of relative humidity for the month ranges about as follows: New England, from 62 at Springfield, Mass., to 75 at Wood's Holl and Eastport; Middle Atlantic States, 53 at Lynchburg to 81 at Atlantic City; South Atlantic States, 61 at Augusta to 86 at Cape Hatteras; 67 at Key West; Gulf States, 55 at Shreveport to 75 at Galveston; Ohio valley and Tennessee, 54 at Memphis to 67 at Pittsburg; Lower Lake region, 66 at Oswego to 82 at Buffalo; Upper Lake region, 68 at Marquette to 83 at Milwaukee; Upper Mississippi valley, 57 at St. Louis to 67 at Keokuk; Red River of the North valley, 74 at Pembina to 76 at Breckenridge; Lower Missouri valley, 62 at Leavenworth to 71 at Bismarck; Western Texas, 41 at Fort Griffin to 44 at Mason; Indian Territory, 56 at Fort Gibson; western portions of Kansas and Nebraska, 54 at Dodge City to 61 at North Platte; Rocky Mountain Stations, 41 at Santa Fe to 59 at Cheyenne; Utah and Nevada, 53 at Salt Lake City to 58 at Winnemucca; Idaho, 62 at Boise City; California, 73 at Los Angeles to 79 at San Diego. The percentage at high stations is 65 for Pike's Peak and 86 for Mount Washington.

WINDS.

The prevailing winds at the Signal Service stations are shown by the arrows, flying with the wind, on chart No. II. The maximum velocities, in miles per hour, have been given in the description of the movements of low pressure areas.

Total Movements of the Air.—The following are the largest monthly movements as recorded at the Signal Service stations, viz.: Pike's Peak, 17,279 miles; Cape May, 13,171; Sandy Hook, 12,335; Thatcher's Island, 12,176; Cape Lookout, 12,039; Dodge City, 11,711; North Platte, 10,892; Sandusky, 10,832; Barnegat, 10,472; Kittyhawk, 10,200; Breckenridge, 10,374; Cheyenne, 10,024; Cape Henry, 9,961; Ft. Whipple, 9,704; Boston, 9,599; Eastport, 9,489; Key West, 9,015. The smallest are: Visalia, 1,728 miles; Deadwood, 2,156; Uvalde, 2,627; Bracketville, 3,088; Augusta, 3,155; Boise City, 3,169; Lynchburg, 3,225; Laredo, 3,364; Knoxville, 3,562; Los Angeles, 3,690; Shreveport, 3,944; Springfield, 3,990.

Local storms, tornadoes, &c., have occurred, as follows: On the 2nd, Casey Co., Ky., between 2 and 3 p. m., a severe tornado occurred, doing great damage in vicinity of Rich Hill and Mt. Olive. Its path was about 400 yards wide, and in its course swept away dwellings, large trees, horses, cattle and other stock;

seven persons were killed and several injured. 10th, about 11 a. m., a violent wind-storm, without rain, passed over Atlanta, Ga., and vicinity, filling the atmosphere with dust and doing considerable damage to buildings, fences, &c. 11th, tornado reported in vicinity of Danville, Ky. 12th, Jefferson Co., W. Va., frightful storm of hail and rain, destroying wheat, &c.; damaging buildings and killing cattle. 27th, Green Springs, Ala., tornado, blowing down trees, houses, &c.; wind at 1 p. m., SE.; at 3 p. m., SW. 28th, fifteen miles NE. of Quitman, Ga., tornado, destroying two houses; path narrow and not extending far; commenced with a southwest wind.

VERIFICATIONS.

Indications.—As worked up three times daily and carefully compared with the actual conditions during the succeeding twenty-four hours, the following results have been obtained, viz: the percentage verified averages 87.0 for New England, 88.8 for the Middle States, 87.6 for the South Atlantic States, 79.5 for the Eastern Gulf States, 81.7 for the Western Gulf States, 87.4 for Tennessee and the Ohio valley, 87.2 for the Lower Lake region, 87.4 for the Upper Lake region, 86.6 for the Upper Mississippi valley, and 84.6 for the Lower Missouri valley. For all the districts the average verified is 85.8 per cent. By elements the percentage verified averages 88.8 for the weather, 85.0 for the wind direction, 87.6 for the temperature, and 81.8 for the barometer. There were 6 omissions to predict, (5 for temperature and 1 for barometer,) out of 3,720, or 0.16 per cent. Of the 3,714 predictions that have been made 81, or 2.2 per cent., are recorded as having completely failed; 118, or 3.2 per cent., as one-fourth verified; 372, or 10.0 per cent., as one-half verified; 686, or 18.5 per cent., as three-fourths verified; 2,457, or 66.1 per cent., as fully verified.

Cautionary Signals.—The display of signals was resumed at all the Lake stations on the 15th. Out of 233 signals ordered, 191, or 82 per cent., were justified by subsequent hourly velocities of 25 miles and over at or within 100 miles of the station, but of these 21 were somewhat late; 42 signals were not justified. There were 62 cases reported from scattered stations, in which the velocity reached 25 miles or over, without the display of signals.

NAVIGATION.

Stages of water in Rivers.—In the table on the right-hand side of chart No. III are given the highest and lowest readings of the Signal Service river-gauges for the month, with the dates. The *Red* river rose steadily from the 1st to the 10th, and then fell to the close of the month. The *Arkansas*, at Little Rock, fell during the first few days, then rose to the 16th, after which it regularly fell. In the *Tennessee*, *Cumberland*, *Savannah*, *Allegheny*, *Youghiogheny* and *Monongahela* the changes were unimportant. The *Ohio*, at Pittsburgh, rose 44 inches on the 4th and 5th. At Cincinnati there was an almost constant fall from 30 ft. 10 in. the 1st to 22 ft. 8 in. the 11th, then rose to 33 ft. 5 in. by the 17th, and fell to close. At Louisville it fell from 11 ft. 20 in. the 1st to 9 ft. 9 in. the 12th; then rose to 12 ft. 4 in. the 17th, and afterwards fell. In the *Missouri* the changes were light. *Mississippi*, from St. Paul to Keokuk, the oscillations were not important. At St. Louis, rose to 17 ft. 1 in. the 6th, fell to 15 ft. 9 in. the 9th, rose to 22 ft. 10 in. by the 12th, and then fell to its minimum near close of month. At Cairo, fell from 33 ft. the 5th to 30 ft. 11th, rose to 35 ft. 9 in. by 17th, and then fell to its minimum. At Memphis, rose from 26 ft. the 1st to 26 ft. 11 in. the 8th, fell to 25 ft. 5 in. the 13th, rose to 28 ft. 8 in. the 20th, and afterwards fell. At Helena, oscillated between 35 ft. 6 in. the 14th and 37 ft. 11 in. (within 2 ft. of the danger-line,) on the 22d, and then fell to near 27 ft. the 31st. At Vicksburg, steadily rose from 1st to 25th, remained stationary to the 28th, and fell to 40 ft. 6 in. by 31st New. At Orleans the changes were very gradual.

Ice in rivers and harbors.—The following items will serve to show the condition of the rivers and harbors in this respect: The *Missouri*—Bismarck, 3rd to 5th, ice soft; 6th, breaking up, teams broke through; 8th, ice moving; 11th, river rising; 16th, ice commenced running out; 17th, clear; 18th, floating ice; 19th, clear; 20th, navigation opened. Ft. Rice, D. T., 10th, main channel filled with broken ice; 12th, ice moving; 15th, clear. Leavenworth, 27th, first boat passed up river. *Red River of the North*—Pembina, 11th, ice covered with water, crossing unsafe; 14th, breaking up; 15th, moving out; 16th, clear; 17th, full of floating ice; 18th, clear, navigation opened; 22nd, first steamer arrived. *Upper Mississippi*—St. Paul, 1st to 4th, river open, thin floating ice; Dubuque, 10th, first steamer from below, arrived; Davenport, 9th, navigation opened; Keokuk, 8th, first boat left for St. Paul. *Upper Lakes*—Duluth, 17th, first arrival; 19th, first departure. Escanaba, 5th, ice moved from around docks, navigation opened, 16th, ice cleared out of bay. Northport, 5th, shore-ice left Bay; 20th, first steamer arrived. Grand Haven, 15th, "no ice in straits to prevent vessels passing through," first steamer arrived. Alpena, Thunder Bay river frozen over until 3rd; 4th to 6th, ice in river breaking up; 7th, clear; 10th, first boat arrived. Saginaw Bay, Lake Huron, 5th, ice moved out. *Georgian Bay and Lake Huron*.—8th, perfectly free of ice; navigation partly opened at Owen Sound, Georgian Bay. Detroit 7th to 8th, floating ice. Port Huron, 24th, lake navigation commenced. *Lower Lakes*—Cleveland, 1st, ice broken up on lake; 20th, navigation opened. Buffalo, 1st, harbor and lake entirely free from ice; 16th, navigation opened. Oswego, 9th, first vessel arrived. *St. Lawrence river*, 10th, free of ice from the lake to Ogdensburg. *Hudson river*—Albany, 5th, ice moving; 6th, floating ice at Rhinebeck, Barrytown, Germantown, Catskill to Stockport, and slight gorges from Stockport to Schoodack; 9th, open from Albany to New York; 14th, Albany, first boat from New York arrived; 24th, shore ice formed, bays and coves frozen over. *Penobscot river*, Maine, 12th, ice out of river as far as the Narrows. *St. Croix river*, Maine, 15th, navigation opened as far as Calais. *Kennebec river*, Maine, 16th, ice-jam at lower end of Swan Island broke, opening navigation to Augusta nearly a month earlier than usual. *Sebago Lake*, Maine, 31st, lower bay still covered with ice. *Mount Desert*, Maine, 13th, ice out of harbor. 19th, Pennsylvania canal, Pennsylvania, opened; Delaware and Raritan canal, New Jersey, opened.

ATMOSPHERIC ELECTRICITY.

Thunder-storms.—1st, Kan., Tenn., Ill., Ark., Tex.; 2nd, Ky., Ga., Ill., Ind., N. C., Tenn.; 3rd, Va., Md., Mass., Conn., Del., Fla., Ind., N. J., N. Y., Pa.; 4th, Mass.; 6th, Tex., Iowa, Mo., Ind., Mich., Ill., Kan., Ohio, Wis.; 7th, Minn., Miss., Pa., N. J., Va., R. I., Conn., Dak., N. Y., Kan., Md., Mass., W. Va.; 8th, Ind. T., Neb., Dak., Minn., Tex., Ill., Iowa, Kan., Mo., Wis.; 9th, Tex., Ala., La., Tenn., Ark., Del., Iowa, Miss., Mo.; 10th, Fla., Ala., Md., Mass., Pa.; 11th, Ind. T., Kan., Ala., W. Va., Tenn., Pa., Fla., Va., Md., Ga., Iowa, Ky., Mo., Neb., N. Y., Ohio, W. Va.; 12th, Ala., Iowa, Mo., Ohio, W. Va., Ky., Ill., Va., Pa., N. Y., N. J., Md., Del., Fla., Ga., Ind., N. C., S. C., Tenn.; 13th, Va., Pa., N. J., N. Y., Fla., Ind., Md., Ohio; 14th, Pa., N. J.; 15th, Tex.; 16th, Mich., Ohio, Tex.; 17th, Fla.; 18th, N. M., Cal.; 19th, Kan., Dak.; 20th, Kan., Neb., Iowa, Dak.; 21st, Ind. T., Nev., Dak., Ill., Iowa; 22nd, Tex.; 23rd, Mich., Ohio, Ind., Ill.; 24th, Cal., W. Va., Ohio, Pa., Va., N. J., Del., Ind., Iowa, Md., N. Y.; 25th, Idaho; 26th, Neb., Cal., Tex., Ohio, Mich., Kan., Ind., Tex.; 27th, Tex., La., Miss., Ala., Mo., Mich., Ohio, N. Y., Pa., Ark., Fla., Ill., Ind., Kan., Mass., N. C., Tenn.; 28th, Utah, Fla., Tenn., Ga., S. C., N. C., Va., Md., Me., Ind., Mass., Mo., Pa.; 29th, Ind. T., Ill., Kan., Mo., Tex., W. Va.; 30th, Ala., Fla., Tenn., Ohio, Ky., Ind. T., Ga., La., Md., Tex., W. Va.; 31st, Tex., Miss., W. Va., Pa., Fla., Ga., La., Ohio, Va.

Auroras.—Pembina, Dak., 3rd and 23rd; Newbury, Vt., 29th; Kensico, N. Y., 17th; Starkey, N. Y., 5th; Coalville, Utah, 3rd; Judsonia, Ark., 8th; Vevay, Ind., 20th; Cresco, Ia., 27th; Iowa City, 1st, 12th, 23rd, 27th, 28th; Woodstock, Md., 6th, 21st, 22nd, 26th, 28th. On Pike's Peak the electricity was intense, and interfered with the working of wires on the 6th and 26th; North Platte, strong, 8th; Santa Fé, interfered with the working of telegraph lines north and south, 18th and 26th.

Magnetic Phenomena.—Prof. G. Hinrichs, Iowa City, Ia., reports the average diurnal magnetic range in declination as 6.6 minutes.

OPTICAL PHENOMENA.

Solar Halos.—1st, Ill., Ind., Mich., N. Y., Ohio, Pa., Wis., Ga.; 2nd, Conn., Me., N. H., N. Y., Vt., Fla., Ga., R. I., N. C.; 3rd, Cal.; 4th, Ohio; 5th, Ill., Ind., Iowa, Kan., Mich., Wis., Ohio, Ga.; 6th, Ill., Ind., Iowa, Me., Md., Mass., Mich., N. H., N. Y., Va., N. M., R. I., Vt., Conn.; 7th, Del., Ill., Iowa, Ohio, Tex., Ga., N. C., R. I.; 8th, Ind., Ohio, Mich., Ga., S. C.; 9th, Ill., Ind., Ohio, Ky., Ga., Me.; 10th, Iowa, Ohio, N. M., Mich., Me.; 11th, Ill., Iowa, Me., Neb., Ohio, Wis., S. C., Vt., N. H.; 12th, Iowa, Ohio, Me.; 13th, Fla., S. C.; 14th, Ohio, Mich., Conn., N. C.; 15th, Iowa, Miss., Neb., N. Y., Pa., Cal., La., Mich., S. C.; 16th, Miss., Ohio, Cal., Tex., La., S. C., Ga.; 17th, Me., N. Y., Vt., Col., La., Fla., S. C.; 18th, Ohio, Col.; 19th, Cal., La.; 20th, Ill., Iowa, Miss., Wis., La.; 21st, Conn., Miss., N. H., N. Y., Ohio, Pa., S. C., N. C., R. I.; 22nd, Col., S. C.; 23rd, Conn., N. J., Ohio, Cal., R. I., Vt.; 24th, Conn., Ohio, S. C., Me.; 25th, Conn., N. M.; 26th, N. Y., Ohio, Cal.; 27th, Minn., Mich., Ohio, N. C.; 28th, Iowa, Mich.; 29th, Ill., Ind., Ohio, Ky.; 30th, N. Y., S. C., Ga., N. C., Va.; 31st, Cal., Iowa, N. H., N. Y., Vt.

Mirage.—Morristown, Dak., 31st; Olivet, Dak., 24th, 25th; New London, Conn., 21st.

MISCELLANEOUS PHENOMENA.

Botanical.—Alabama—in bloom, 17th, quince and dogwood; 11th, sloes and wild plums; 12th, buckeye; 20th, honeysuckle; 25th, may-apple; 24th, snowdrops; 20th to 30th, apple and pears; 21st, fish poison; 16th, peach, apricot and plum; in leaf, 10th, quince tree; 8th, poplar and tulip trees. California—Visalia, in bloom, 2nd, apple; 3rd, plum. Connecticut—in bloom, 16th, white maple; in leaf, 19th, sycamore and elm; 15th, willow; budding, 6th, flowers; 8th, spirea; 19th, cherry; 20th, apple and pear; 24th, tigerlilies and lilies of the valley sprouting. Arkansas—in bloom, 15th, red-bud trees; 6th, apricots; 18th, dogwood; 22nd, lilacs; 25th, sweet gum; 26th, buckeye; in leaf, 16th, black and red oak. Dakota—Olivet, 1st, grass and weeds sprouting; Pembina, 24th, willows in bloom, grass sprouting. Florida—in bloom, 7th, peaches; in leaf, 28th, trees generally. Georgia—in bloom, 7th, peach and plum; in leaf, 20th, forest trees. Illinois—in bloom, 20th to 24th, peach; 22nd, japan quince; 25th, violets; 27th, flowering almond; 28th, daffodills; 21st, cowslips; 7th, ash and elm; in leaf, 11th, gooseberry; budding, 8th, peonies, gooseberries, rose bush, lilac and crab-apple; sprouting, 6th, grass and rhubarb. Indiana—in bloom, 1st, daffodills; 12th and 19th, peach; 8th, pansies; 14th, violets; 12th, iris, lilac and hyacinth; 10th, spinage gathered; budding, 8th, peach. Iowa—in bloom 23rd, 26th and 31st, peach; 11th, maple and elm; 16th, liverwort, wild flowers and hazel brush; 21st, cottonwood and box elder; 14th, poplars; 18th, myrtle; 24th, june cherries; 31st, siberian crab-apple; in leaf 8th, plum; 31st, apple; budding, 9th, maple and lilac; sprouting, 8th, grass and leeks; 24th, wheat; 31st, grass sufficient for pasture. Indian Territory—Fort Sill, in bloom 5th, peach. Idaho Territory—Boise City, in bloom 20th, plum and cherry; 22nd, peach. Kansas—in bloom, 9th, 11th, 19th to 21st, peach; 25th, wild plum and judas tree; 16th, tulips and ivy; 13th, maples; 15th, violets; 20th, plums; 26th, red bush; 27th and 30th, apples; in leaf, 5th raspberries; 14th, lilacs; 23rd, apples; 31st, pear, peach and forest trees; 22nd, crab-apple; 19th, rose and vine; budding, 6th, maples; sprouting, 31st, corn and oats; 14th, prairie grass. Louisiana—in bloom, 16th, orange trees. Maine—28th, mayflowers first gathered. Maryland—in bloom, 24th, peach; 14th, forsythia; 17th, plum; 24th, cherry; 7th, crocus and perriwinkle; in leaf, 11th, weeping willow; budding, 8th, alder. Massachusetts—in bloom, 1st, skunk cabbage; 13th and 14th, crocus; 23rd, pansies; 10th, violets; in leaf, 23rd, lilac and syringa; budding, 12th, willow. Mississippi—in bloom, 1st, pitch pine; 5th, sweet-gum, evergreen, cherry, yellow woodbine and red maple; 6th, violets, spider-wort and whortleberry; 3d, post oak, red oak and plum; 8th, dewberry, red woodbine, sassafras and judas tree; 10th, flag-lilly; 12th, papaw; 13th, spirea, flowering almond and verbena; 16th,

white oak, black-jack oak, iron-wood, crab-apple, dogwood, box-alder and live oak; 17th, beech, wild cherry and long-leaf pine; 21st, azalia and apple; 27th, petunias, begonias, roses, sweet william and blackberry; 31st, black locust; in leaf, 6th, poplar; 12th, china tree; 30th, all forest trees in full leaf. Michigan—in bloom, 13th, polyanthus; 19th, maple. Missouri—in bloom, 1st, hazel; 10th, 13th, 20th and 22d, peach; 8th, elm and maple; 18th, service berry; 19th, crocus and apricot; 21st, bridal-wreath; 28th, flowering almond; in leaf, 8th, rose and lilac; 7th, gooseberry and raspberry; 14th, clematis; 24th, morello-cluny tree and cherry; 22d, siberian crab-apple; 27th, pear and plum; budding, 2d, honeysuckle; sprouting, 2d, alder; 6th, violets; 10th, grass green and growing finely; 28th, wheat twenty-two inches high. Nebraska—in bloom, 20th, 25th, 31st, peach; 8th, maple; 20th, cotton-wood; 23rd, apricot; 26th, gooseberry. Nevada—Winnemucca, 23rd, grass growing, sage brush in leaf. New Mexico—Santa Fe, 25th, trees budding, grass sprouting. New Jersey—in bloom, 17th, forsythia; 19th, japan quince; 27th, peach and maple; 9th, blue-bells and lillies; in leaf, 17th, lilac; 31st, grass forward, and wheat in excellent condition. New York—in bloom, 12th, soft maple; 16th, may flowers; 15th, dandelion; budding, 29th, lilac; 8th, wild onions and grass growing; 31st, wheat looks very well. North Carolina—in bloom, 4th and 27th, peach; 3rd, apricot; budding, 3rd, peach. Ohio—in bloom, 20th, peach; 9th, maple; 8th, crocus and snowdrops; 14th, violets; 28th, cherry; 10th, elm; budding, 9th, lilac; 11th, grass growing; 27th, wheat looking very well. Pennsylvania—in bloom, 7th, maples; 31st, peach and apricot; 31st, wheat looking well. South Carolina—in bloom, 1st, peach; 13th, oak. Tennessee—in bloom, 5th, wild flowers; 11th, plum; 14th, peach; Memphis, 31st, vegetation much advanced. Texas—in bloom, 12th, roses; in leaf, 16th, live oak; 31st, wheat and oats look well, corn sprouting. Utah—Salt Lake City, in bloom, 24th, apricot; 28th, peach. Virginia—in bloom, 13th, 14th, 15th, 23rd and 27th, peach; 10th, apricot; 15th, cherry; 20th, plum; 22nd, forsythia; 11th, liver-wort; 10th, strawberries; in leaf, 22nd, willow and crab apple; 27th, gooseberry and quince; budding, 26th, canada snake root; 12th, grass growing finely. West Virginia—Morgantown, in bloom, 17th, easter flowers; 19th, peach; in leaf, 17th, rose bushes; 18th, jessamine; 12th, gooseberry; 12th, apple trees in full bud. Wisconsin—in bloom, 31st, elm, white maple, alder, willow, lombard poplar, liverwort and blood root; budding, 31st, crab-apple, lilac and currant.

BIRDS.—*Blackbirds*: Ft. Pembina, Dak., 20th; Southington, Conn., 4th; St. Mary's Home, Ind., 4th; Monticello, Ia., 13th; Vail, Ia., 6th; Creswell, Kan., 24th; Cornish, Me., 29th; Standish, Me., 23rd; Waltham, Mass., 5th; Oregon, Me., 18th; Genoa, Neb., 9th; Waterburg, N. Y., 29th; Palermo, N. Y., 6th; Contoocookville, N. H., 22nd; Linden, N. J., 10th; Starkey, N. Y., 13th. *Bluejays*: Detroit, Mich., 2nd. *Bluebirds*: Ft. Wayne, Mich., 6th; Mt. Sterling, Ill., 1st; Tabor, Ia., almost daily; Boonsboro, Ia., throughout month; Milford, Ind., 1st; Cornish, Me., 9th; Rowe, Mass., 10th; Waltham, Mass., 1st; New Bedford, Mass., 30th; Northport, Mich., 11th; Minneapolis, Minn., 6th; Palermo, N. Y., 3rd; Auburn, N. H., 7th; Dunbarton, N. H., 1st; Waterburg, N. Y., 7th; Coalville, Utah, 20th; Woodstock, Vt., 7th; Madison, Wis., 4th. *Thrush*: Urbana, Ohio, 30th. *Robins*: Southington, Conn., 6th; Hennepin, Ill., 4th; Monticello, Ia., 7th; Tabor, Ia., almost daily; Boonsboro, Ia., throughout month; Vail, Ia., 27th; Afton, Ia., 14th; Cornish, Me., 20th; West Waterville, Me., 20th; Standish, Me., 10th; Rowe, Mass., 10th; Waltham, Mass., 15th; New Bedford, Mass., 8th; Fall River, Mass., 10th, in great numbers; Detroit, Mich., 1st; Northport, Mich., 10th; Minneapolis, Minn., 21st; Norfolk, Neb., 11th; Plattsmouth, Neb., 1st; Auburn, N. H., 9th; Dunbarton, N. H., 9th; Linden, N. J., 6th; Waterburg, N. Y., 7th; Flushing, N. Y., 1st; Chambersburg, Pa., 4th; West Charlotte, Vt., 17th; Coalville, Utah, 21st; Woodstock, Vt., 8th; Lynchburg, Va., 1st; Ashland, Wis., 20th; Rocky Run, Wis., 3rd; Madison, Wis., 1st; New London, Conn., 8th. *Geese*: Ft. Hartsuff, Neb., 18th; Judsonia, Ark., 27th, 28th, 29th; Southington, Conn., 10th, 16th, 30th; Morristown, Dak., 1st; Quitman, Ga., 1st; Riley, Ill., 1st, 2d; Mt. Sterling, Ill., 1st; Laconia, Ind., 2d; St. Mary's Home, Ind., 4th; Monticello, Iowa, 5th; Tabor, Iowa, almost daily; Boonsboro, Iowa throughout month; Creswell, Kan., 20th, 27th, 28th; West Waterville, Me., 25th; Standish, Me., 4th; Mt. Desert, Me., 7th; 7th; Oregon, Mo., 6th; Genoa, Neb., 16th; Litchfield, Mich., 3rd and 4th; Frankford, Mo., 4th; Norfolk, Neb., 20th; Palermo, New York, 3d; Auburn, New Hampshire, 28th; Catawissa, Pa., 17th. *Ducks*: Olivet, Dak., 1st; Mt. Sterling, Ill., 8th, 20th; Monticello, Iowa, 5th; Tabor, Iowa, almost daily; Boonsboro, Iowa, throughout month; Standish, Me., 4th; Frankford, Mo., 2nd; Rocky Run, Wis., 4th. *Swallows*: Fayette, Miss., 30th; Prospect Hill, Va., 19th. *Cedar birds*: Prospect Hill, Va., 18th. *Meadow Larks*: Ft. Pembina, D. T., 29th; Mt. Sterling, Ill., 21st; Monticello, Iowa, 4th; Vail, Iowa, 11th; Milford, Ind., 7th; Afton, Iowa, 14th; Empire City, Kan., 4th; Norfolk, Neb., 14th; Genoa, Neb., 6th; Contoocookville, N. H., 29th; Urbana, Ohio, 19th. *Redbirds*: Houston, Fla., 8th; Cornish, Me., 29th; Somerset, Mass., 7th; Waterburg, N. Y., 29th; Starkey, N. Y., 16th; New London, Conn., 8th. *Woodpeckers*: Creswell, Kan., 23rd; Starkey, N. Y., 28th. *Osprey*: Prospect Hill, Va., 23rd. *Cranes*: Houston, Fla., 7th; Tabor, Iowa, almost daily; Vail, Iowa, 31st; Empire City, Kan., 7th; Baxter Springs, Kan., 5th; Genoa, Neb., 22nd; Belmont Farm, Tex., 18th. *Sparrows*: Monticello, Iowa, 10th; Cornish, Me., 16th; Standish, Me., 10th; Rowe, Mass., 10th; Waltham, Mass., 13th; Somerset, Mass., 19th; Oregon, Mo., 11th; Contoocookville, N. H., 22nd; Waterburg, N. Y., 8th; Ringgold, Ohio, 26th; Chambersburg, Pa., 4th; Woodstock, Vt., 13th. *Hummingbirds*: Fayette, Miss., 28th; Brookhaven, Miss., 24th; Starkey, N. Y., 30th. *Pigeons*: Northport, Mich., 7th and 8th, numerous. *Bobolinks*: Chambersburg, Pa., 2nd. *Oriole*: Stratford, Vt., 18th. *Phebes*: Starkey, N. Y., 11th, West Charlotte, Vt., 31st. *Chickadees*: Starkey, N. Y., 16th. *Prairie Chickens*: Olivet, Dak., 5th; Creswell, Kan., 9th. *Whippoorwills*: Forsyth, Ga., 20th; Milford, Ind., 12th; Brookhaven, Miss., 19th. *Killdeers*: Creswell, Kan., 12th, Norfolk, Neb., 8th; Palermo, N. Y., 28th; Bellefontaine, Ohio, 10th; Bloomfield, Wis., 10th. *Nightingale*: Fayette, Miss., 28th. *Mockingbirds*: Judsonia, Ark., 7th; Brookhaven, Miss., 28th. *Wrens*: Chambersburg, Pa., 30th. *Martins*:

Houston, Fla., 4th; Laconia, Ind., 17th; Stanley, Kan., 30th; New Market, Md., 16th; Lebanon, Mo., 28th; Ringgold, Ohio, 28th; Chambersburg, Pa., 29th. *Owls:* Oregon, Mo., 12th.

Earthquakes.—On the 12th at Columbus, Ky., 4 a. m., severe shock overturning furniture, &c.; a portion of the bank of Mississippi river caved in; rumbling lasted a few seconds. 12th, Milford, Vt., two shocks. 17th, St. Thomas, Lower California, two sharp shocks. 18th, Tacoma, Wash. T., 6:30 a. m., shock plainly felt.

Sun spots.—The following observations, made by Mr. D. P. Todd, have been kindly communicated by Rear Admiral John Rogers, U. S. N., Superintendent of the U. S. Naval Observatory:

March, 1878.	No. of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Remarks.
	Groups	Spots	Groups	Spots	Groups	Spots	Groups	Spots	
1st, 1 p. m...	0	0	0	0	0	0	0	0	Large group of faculae.
3rd, 3 p. m...	1	8	0	0	0	0	1	8	
5th, 10 a. m...	1	1	0	0	0	0	2	5	
5th, 12 m...	0	0	0	0	0	0	2	3	Spots mostly small.
8th, 1 p. m...	0	2	1	4	0	0	1	3	
8th, 10 a. m...	0	0	0	0	0	0	1	0	
9th, 2 p. m...	0	0	0	0	0	0	1	0	Large groups of faculae.
9th, 11 a. m...	0	0	0	0	0	0	1	5	
4 p. m...	1	1	0	0	0	0	2	0	
11th, 11 a. m...	0	9	0	0	0	0	1	10	Large group of faculae. Many of the spots small.
13th, 10 a. m...	0	4	0	0	0	0	1	14	
16th, 10 a. m...	0	10	0	0	0	0	1	24	
18th, 11 a. m...	0	0	0	13	0	0	1	2	Large group of brilliant faculae.
19th, 5 p. m...	0	0	1	2	0	0	0	0	
20th, 11 a. m...	1	1	0	0	0	0	1	1	
12 m...	0	0	0	0	0	0	1	1	
4 p. m...	0	1	0	0	0	0	1	2	
21st, 2 p. m...	0	0	0	0	0	0	1	2	
22nd, 11 a. m...	0	0	0	0	0	0	1	1	
5 p. m...	0	0	0	0	0	0	1	1	
23rd, 12 m...	0	0	0	0	0	0	1	1	
25th, 3 p. m...	0	0	0	0	0	0	0	0	
26th, 11 a. m...	0	0	0	0	0	0	0	0	
29th, 12 m...	0	0	0	0	0	0	0	0	

Prof. G. Hinrichs, at Iowa City, Ia., reports none on the 1st, 6th, 18th, 19th, (? cloudy,) 20th, 23rd, 24th, 25th, 26th, 28th and 31st; one group of four spots on the 4th; one group of two spots the 8th and 11th; one group of six spots the 12th.

U. S. Signal Service Telegraph Lines.—Sergeant Belville, in charge of station at Cape Lookout, N. C., reported that on March 21st the U. S. Revenue Steamer Schuyler Colfax anchored off the station, and, by means of the International Code of Signals, asked for and obtained the weather indications. This is believed to be the first instance in which such information has been called for and received from an U. S. Signal Service Station. At 7:35 a. m. March 25th, Private William Bolton, in charge of the "Flying Signal Station" at Life Saving Station No. 3, about twenty-five miles south of Cape Henry, informed the Chief Signal Officer by telegraph that the Austrian brigantine "Nipoli" went ashore early that morning about two miles north of his station, and that he had proceeded to and opened a telegraph station at the scene of the disaster. Notice was at once telegraphed to the Coast Wrecking Companies, U. S. Revenue Cutter, Seaman's Aid Society, &c., at Norfolk, Va., and to the U. S. Revenue Cutter "Hamilton" at Delaware Breakwater, Del. The Coast Wrecking company's steamer "Rescue" left Norfolk at 9:15 a. m. and reached the stranded vessel at 2 p. m. same day. The U. S. Revenue Cutter "Hamilton" arrived there at 6 a. m. of the 26th. Owing to the prompt action of Private Bolton, and the immediate transmittal of said information to the proper authorities, the vessel was saved, having been gotten off at 4 p. m. of the 28th. The following letter in the case is apparent:

WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL OFFICER,
Washington, D. C., March 29th, 1878.

Private WILLIAM BOLTON, *Signal Service, U. S. Army.*
In charge of Flying Station at Life-saving Station No. 3,
Van Slack's Landing, Currituck county, N. C.

SIR: The Chief Signal Officer takes pleasure in commending the alacrity and energy displayed by you at the time of the wreck of the "Nipoli." This is the first instance in which the wreck of a vessel has been reported by telegraph from the scene of wreck in advance of the arrival of the Life-boat.

I am, sir, very respectfully, your obedient servant.
(Signed)

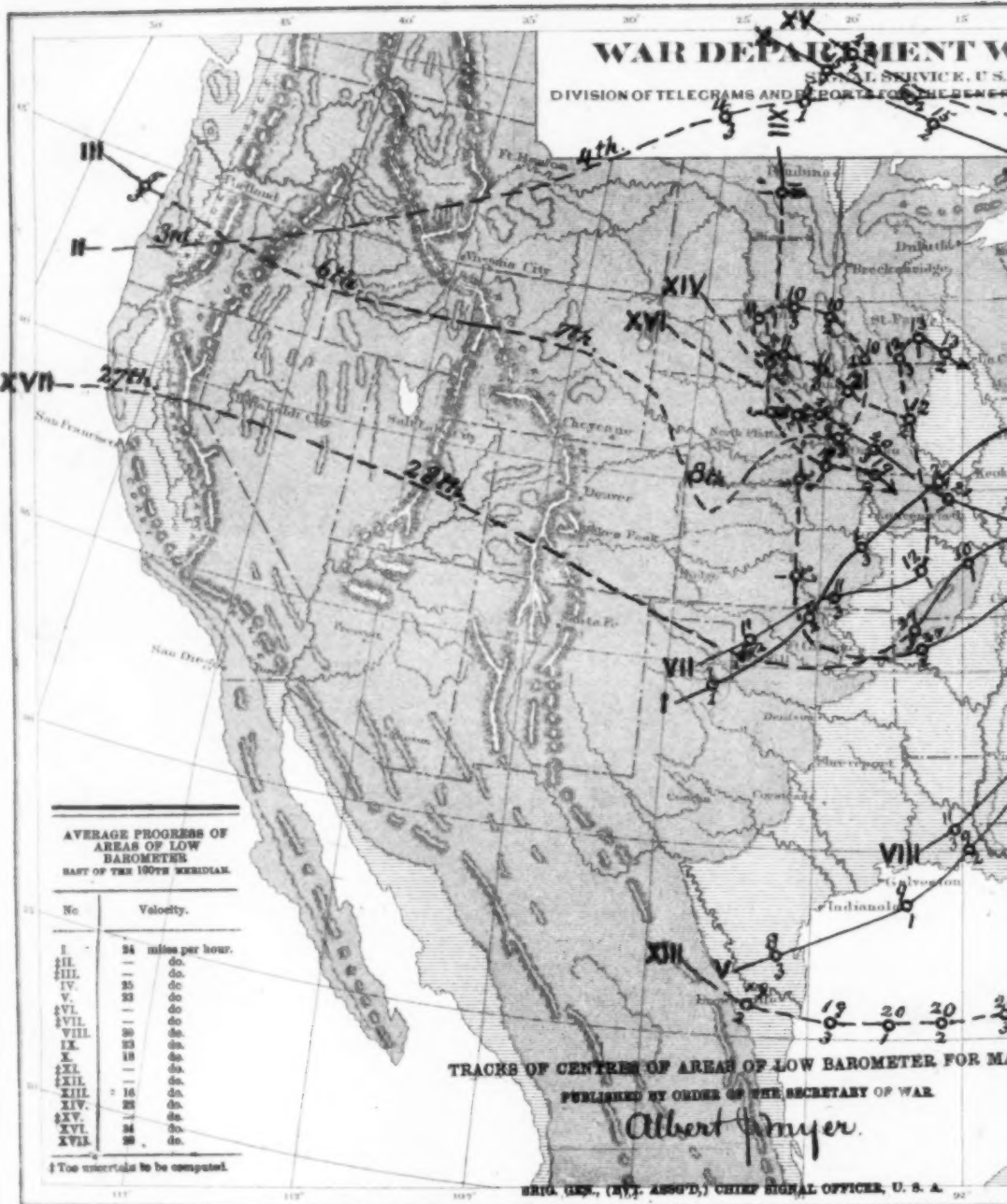
ALBERT J. MYER,
Brig. General, (Bvt. Assigned,) Chief Signal Officer of the Army.

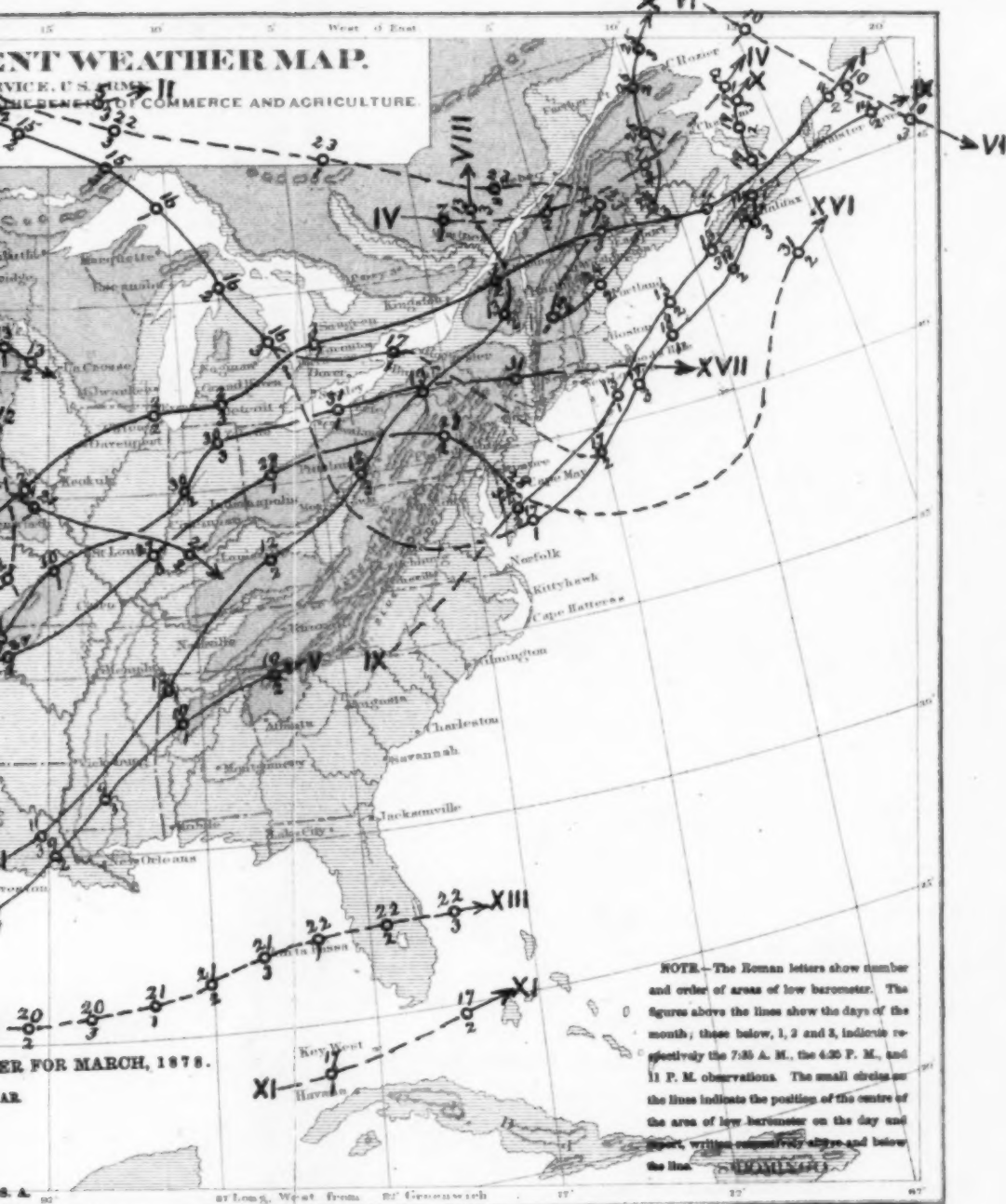
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Albert J. Myer

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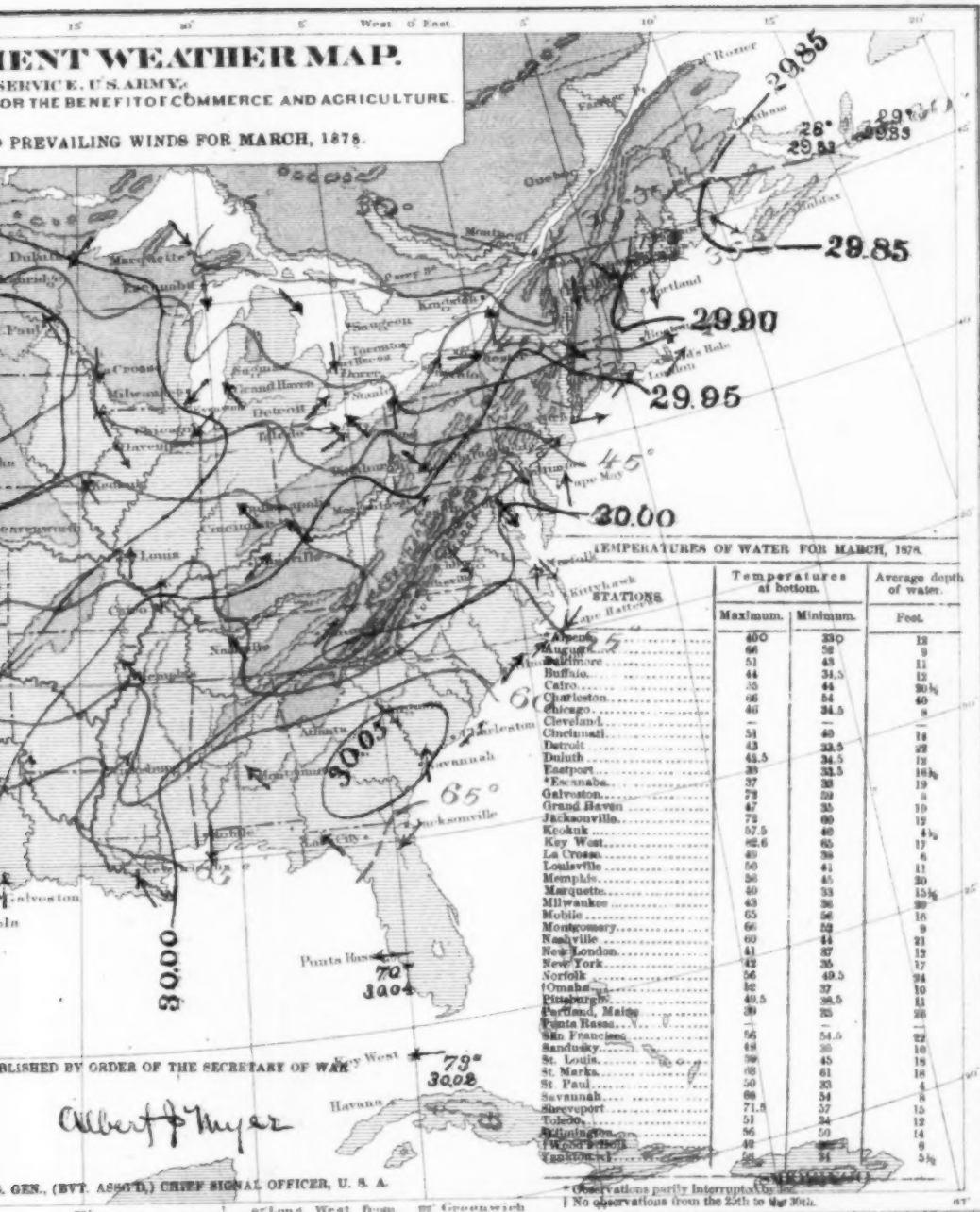
Brig. Gen. (Bvt. Assg'd,) Chief Signal Officer, U. S. A.



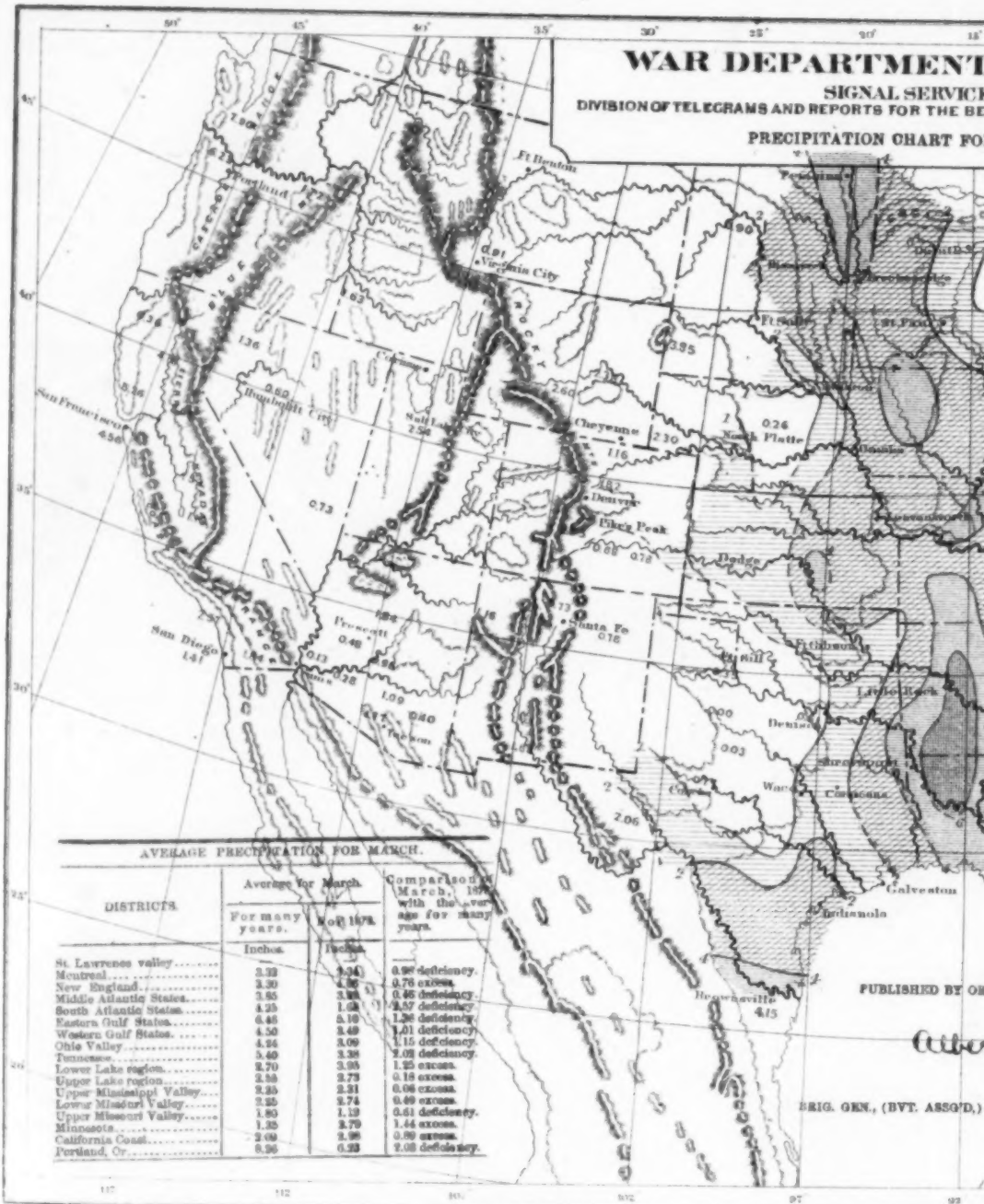


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WINTER WEATHER MAP.

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FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

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